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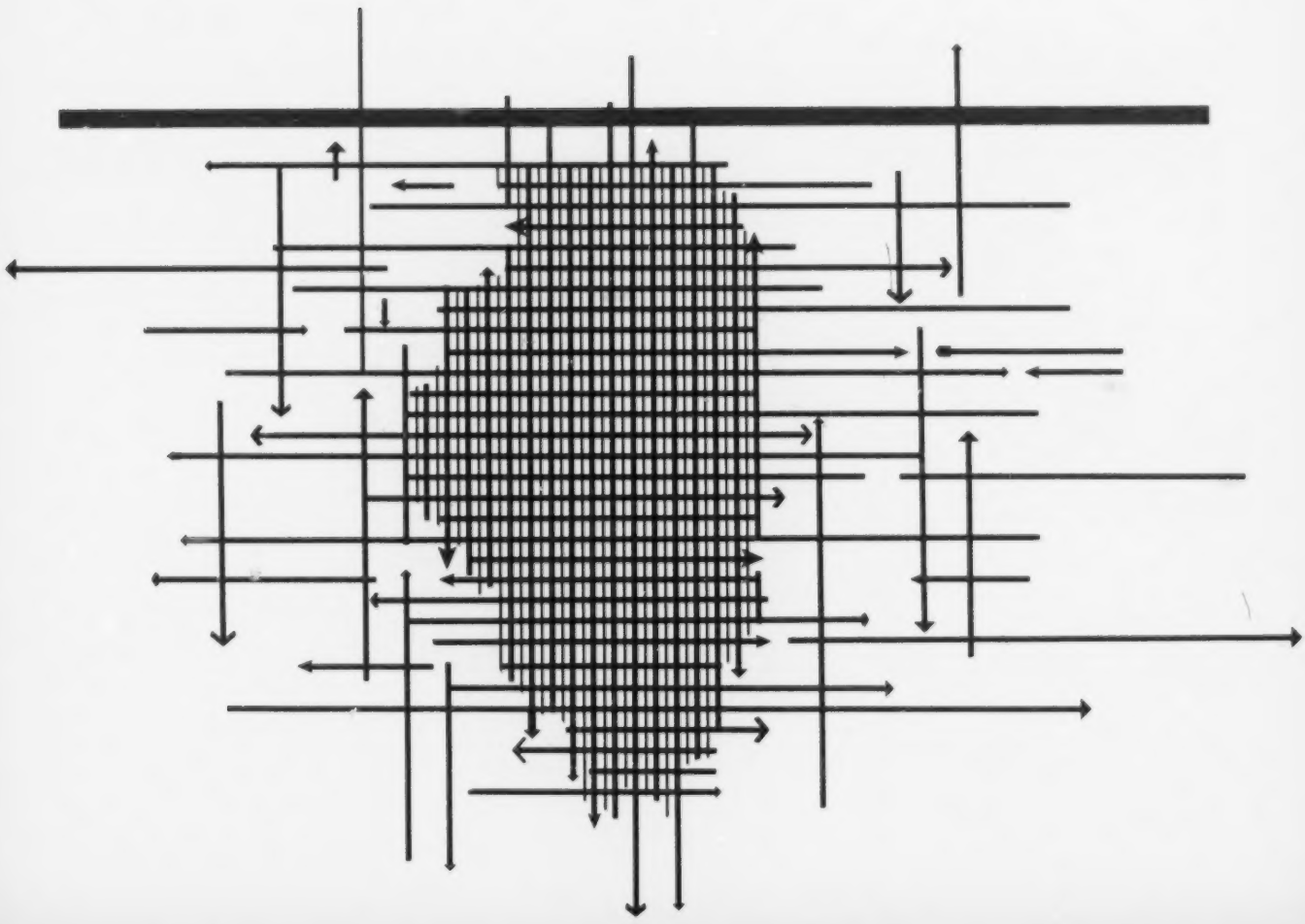

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CARLA TIGHE

National Banking Now

On 1 July 1986 Illinois instituted regional interstate banking. Illinois banks may now be purchased by out-of-state banks if the home states of the purchasers have reciprocal laws. The Illinois law permits interstate banking only within the six-state region surrounding Illinois.

Of the six contiguous states identified by Illinois law, Indiana, Michigan and Kentucky have passed comparable legislation. Similar bills are expected to be passed in Wisconsin and Missouri. Iowa is not expected to act on the issue in the near future.

Regional interstate banking will strengthen midwestern banking. Large banks can take advantage of economies of scale, making them more efficient and less likely to fail. However, the reasons justifying regional interstate banking also hold for national interstate banking. The Illinois law needs to be expanded to allow for banks outside the area (in states having reciprocal laws) to buy Illinois banks. Furthermore, in order for Illinois to remain competitive, we need to be among the first to pass legislation that allows national branch banking.

This brings us to the primary reason for widening the Illinois law at this time: other states have already done so. Since the Supreme Court overruled federal laws prohibiting interstate banking in 1985, many states have provided for interstate banking on a regional level. Several have also included a timetable to open the states to nationwide branch banking.

The Illinois law, on the other hand, contains specific provisions to keep nonadjacent states' banks out of Illinois. Provisions to constrain branching to the region may limit the effectiveness of our law, although regional interstate banking is expected to make Chicago into an even greater financial center. The many corporate headquarters and rapidly growing suburbs make Chicago an attractive location for out-of-state banks. However, if surrounding states allow for nationwide banking before Illinois does, Chicago's financial growth could be curbed. It is plausible to imagine that New York banks would merge with banks in Milwaukee or Indianapolis. After all, these cities also have important advantages. Illinois banks outside Chicago should be concerned for two reasons. First, Illinois banks may find the best merger opportunities

have been lost to banks in states that allowed national banking earlier. Secondly, the initial merger activity will have strengthened competitor banks in surrounding states. In this sense, Illinois banks may find themselves left behind. Illinois needs to be among the first who promote growth by opening its doors to nationwide banking.

Increased Efficiency

There are a number of reasons why growth is important to the Illinois banking system. First, strong midwestern banks with interregional branches can better compete with the giant banks in New York and on the West Coast. Larger banks can also take advantage of economies of scale and compete more efficiently. Merged banks can eliminate duplicative departments. Combining capital-intensive operations such as data processing will also help banks to operate more efficiently. Larger banks are able to raise funds at lower interest rates.

Considerations such as those outlined above serve to lower the cost of banking for consumers and to increase the range of available services. Therefore we would expect to experience lower service fees, increased loan availability, and increased convenience. Also, large national banks can better serve corporate customers whose executives travel frequently or who have many nationally dispersed offices or plants. In short, a national banking system can better serve the consumers.

Decreased Failures

Promoting growth at the national level is also justified for the simple reason that stronger banks are usually less likely to fail. Regional banks in the Midwest will continue to hold loan and deposit portfolios that are heavily balanced towards agriculture and heavy manufacturing. These industries are experiencing serious problems of their own that feed back into the local banking system. An Illinois bank that could also do business in, for example, the "high-tech" corridors of Boston is more likely to weather a regional recession. Also, smaller individual banks may find it more profitable to sell to a national holding company rather than to face increased competition, leading banks that might fail on their own to merge while they are still financially healthy. Thus national branch banking can increase confidence in Illinois banks by making them stronger.

Because the argument in favor of national branch banking is so strong, many analysts view this as the next step after regional banking becomes common. However, it is unlikely that the legislation providing for branch banking will be passed by Congress. Instead, national banking will spread as individual states pass reciprocal laws allowing it (as some have already done). Illinois needs to be among the first to take that next step by allowing banks outside the Midwest to acquire Illinois banks if their states have reciprocal laws.

National banking provides increased services more efficiently and strengthens the banking system. With the number of bank failures rivaling the number that occurred during the Great Depression, the benefits of national banking cannot be taken too lightly. For all these reasons, Illinois should have national banking now.

DAVID LEE

Illinois Leading Indicators

The outlook for the Illinois economy is for slow and steady growth over the next two quarters. This is the conclusion drawn by the index of leading indicators recently developed by the Bureau of Economic and Business Research at the University of Illinois at Urbana-Champaign. Of course, no leading indicator series, including the series constructed for the US economy, can always make an accurate forecast of swings in economic activity. However, careful development of a leading indicator series at the state level can lead to recognizable patterns in the series behavior that are able to indicate when the Illinois economy is about to change direction.

This article begins with a description of the methodology used to construct a leading economic indicator for Illinois. Next, adjustments made to the series based on the concept of a moving average are described, followed by the development of an algorithm to determine if the leading indicator series is correctly predicting turns in state economic activity. Finally, the performance of the series is reviewed over a recent 24-month period.

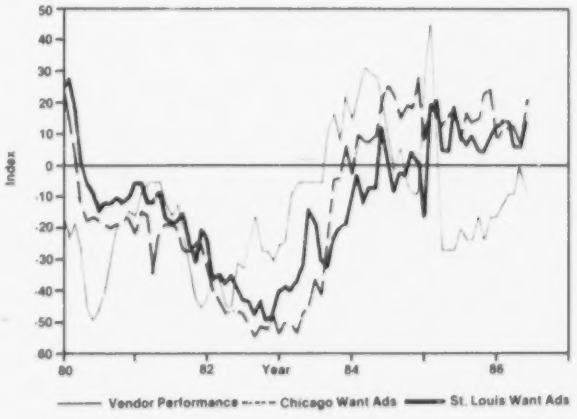
Construction of the Leading Indicator Series

The leading economic indicator is constructed in a manner similar to that employed by the US Commerce Department in compiling the national leading indicator index as described in the *Handbook of Cyclical Indicators*. However, state economies are subject to a number of influences that are not found at the national level. For example, the Illinois economy has agricultural activity as a higher percentage of its economy than does the nation as a whole. For this reason, the components of a leading economic index constructed on a statewide basis are necessarily different from those used in the national tabulation.

Each component of the Illinois leading economic indicator series was chosen on the basis of two important factors. The first relates to the speed with which data pertaining to the series are available; thus, even if an economic series were to lead economic activity perfectly, that series would be of little value if it were available only after a substantial time lag. Second, each series must lead economic activity both in theory and by inspection to avoid problems of spurious correlation. For example, if tuna sales led Illinois economic activity with a perfect three-period span, that series would be rejected as a component of the overall index because there would be no theoretical justification for its inclusion.

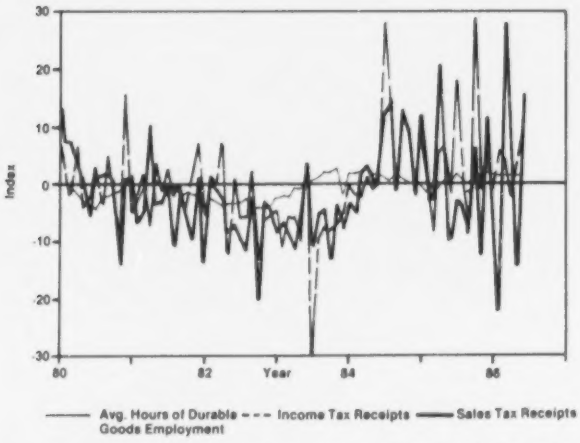
With these considerations in mind, the following monthly series were selected as the components used to calculate the leading indicator index for Illinois: average hours of durable manufacturing employment, building permits, initial claims for unemployment, income tax receipts (a proxy for personal income), sales tax receipts (a proxy for retail sales), Chicago vendor performance (percent of vendors reporting slower deliveries), and the help wanted indexes for Chicago and St. Louis. The data were seasonally adjusted using the X-11 Arima seasonal adjustment routine and transformed into an index (1972:1 = 100). After percentage changes in these indexes were calculated, a final series of components was generated by dividing the percent change by the average percentage change for each series. This was done to avoid series with high degrees of fluctuation from dominating the overall index. Finally, a composite index was constructed from an unweighted average of the eight individual components. This index and its components are illustrated in Charts 1–3 for January 1980 through June 1986.

Chart 1.



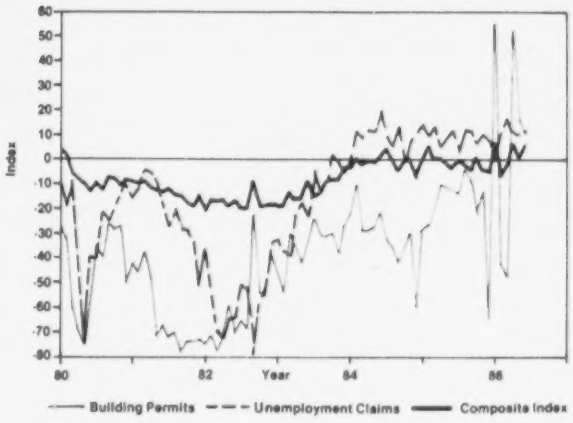
Source: Vendor Performance—Purchasing Management Association of Chicago
Chicago and St. Louis Help Wanted Ad Index—The Conference Board

Chart 2.



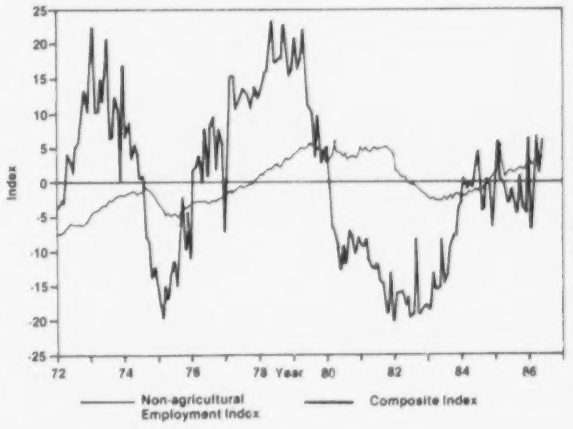
Source: Average Hours of Durable Good Employment—US Department of Labor, Bureau of Labor Statistics. Income and Sales Tax Receipts—Office of the Comptroller, State of Illinois, and Bureau of Economic and Business Research, University of Illinois at Urbana-Champaign.

Chart 3.



Source: Building Permits—US Department of Commerce. Unemployment Claims, Illinois Department of Employment Security.

Chart 4.



Source: Nonagricultural Employment Index—US Department of Labor, Bureau of Labor Statistics, and Bureau of Economic and Business Research, University of Illinois at Urbana-Champaign.

Adjustments to the Series

By comparing the composite index to an index of total Illinois nonagricultural employment, two observations can be made (Chart 4). First, as calculated above the composite index is extremely volatile. Second, this index does in fact lead the four major turns in the Illinois economy during the sample period (1972:1–1986:6). The economy experienced two peaks (1974:10 and 1979:8), and two troughs (1975:10 and 1983:8) over the time frame under study. However, the high degree of series volatility makes changes in overall trends difficult to assess. Therefore, the series is adjusted by performing a three-period moving average in the overall index. This series represents the final leading economic indicator series for the Illinois economy (Chart 5).

Identifying Peaks and Troughs

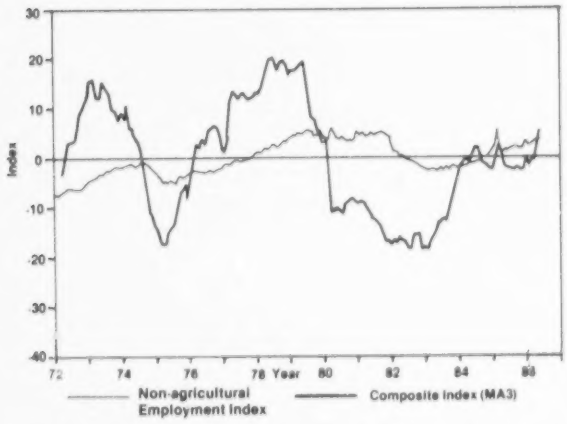
The next step is to specify a rule that allows the researcher to distinguish between changes in series trends that are short-lived as opposed to those that represent a turning point in the overall trend. An example of rules similar to this but somewhat different in application are the rules used by analysts who chart stock market activity. These people recognize that various patterns in the historical price of a stock can indicate a major change in the movement in the stock's price. For instance, the third dip in a stock's price may signal a prolonged fall in the price while a break through the 26-week high could signal of a rising price. Application of these principles to the leading indicator series represents a method for determining changes in the series overall trend, which in turn will signal major changes in future economic activity.

The methodology for selecting a rule that will indicate changes in economic activity is based on a simple statistical property of a moving average. Specifically, it is a fact that as the number of periods included in a moving average of an increasing series is increased, the value of the averaged series relative to the value of a moving average series with fewer periods will decrease. Hence, a four-period moving average will always lie below a two-period moving average for an increasing series. Similarly, the value of a moving average series will increase as the number of periods included in the average increases when the series is decreasing. Thus, a four-period moving average will lie

above a two-period moving average if the series is in decline. Finally, when the series changes direction, it must be the case that moving averages of different lengths must cross, and it is the identification of these crossing points that will constitute the rule for change in the trend of the series.

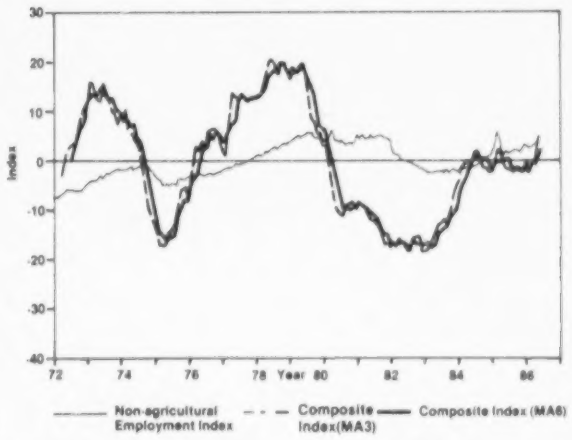
Unfortunately, the procedure outlined above is not so simple if applied to the leading indicator series because of the fluctuations that remain in the series even after smoothing with a three-period moving average. Such variation results in brief periods of time in which the series is in decline even though the overall trend of the series is increasing. Furthermore, the series may increase for a few periods while the general trend of the series is waning. The problem is that such periods cause moving averaged series of different duration to cross even if the overall trend of the series has not changed. Thus, the task is to determine the number of periods to include in the moving average so as to eliminate or minimize the number of false signals emitted concerning turns in the general trend of the series.

Chart 5.



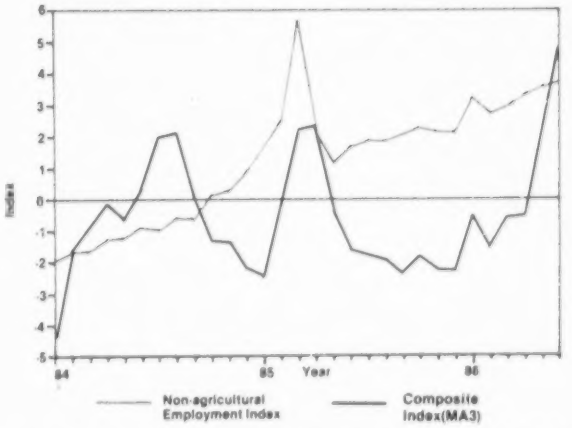
Source: Nonagricultural Employment Index—US Department of Labor, Bureau of Labor Statistics, and Bureau of Economic and Business Research, University of Illinois at Urbana-Champaign

Chart 6.



Source: Nonagricultural Employment Index—US Department of Labor, Bureau of Labor Statistics, and Bureau of Economic and Business Research, University of Illinois at Urbana-Champaign

Chart 7.



Source: Nonagricultural Employment Index—US Department of Labor, Bureau of Labor Statistics, and Bureau of Economic and Business Research, University of Illinois at Urbana-Champaign

After examining numerous combinations of moving averages, the rule selected for the Illinois leading economic indicator series is as follows: If the three-month moving average series rises above or falls below the six-month moving average series for four consecutive months, then the leading indicator series is communicating a major change in economic activity (Chart 6). This particular rule for determining changes in economic performance was chosen because it represents a simple algorithm for determining such changes, and because it did not send incorrect signals about up-turns or down-turns in the state economy over the sample period. However, the accuracy of such a rule is hindered by the fact that only four turns occurred during the sample period. With such a low number of observations, any rule must be suspect.

Behavior of Index: January 1984 to June 1986

The 30-month span from January 1984 to June 1986 yields a particularly interesting illustration of the behavior of the leading economic indicator series (Chart 7). For the first eight months of 1984, the series continued to increase, corresponding to a simultaneous increase in the index of nonagricultural employment. However, the series took a dramatic five-month plunge beginning in September 1984, indicating that

recessionary pressures were on the horizon for the Illinois economy. In April of 1985, this prediction turned out to be correct as the employment index began to decline over the next two months. Therefore, the leading indicator index had correctly anticipated the economic downturn with a lag of seven months.

The more recent history of the leading economic indicator series is less certain than that of previous months. The series increased for the first four months of 1985, while staying above the six-month moving average for only three periods, signaling the potential for an economic upswing. As implied, the economy did in fact offer a slight rebound beginning in June of 1985. Unfortunately, the leading economic indicator series again began to dip in May 1985 and remained below the six-month moving average for seven months. This development signals a minor decline in Illinois economic activity beginning somewhere in the last half of 1986. This corresponds to many predictions made by economists before the drop in oil prices in the first part of 1986. However, December of 1985 showed a marked improvement in the index, and a continued increase in the index for the first six months of 1986 suggests that the predicted downturn may never materialize. Instead, the index seems to indicate slow steady growth in economic activity over the next two quarters.

Conclusion

There are a number of problems with this formulation of the leading indicator series. First, the series is constructed on the basis of a simple average compared to the weighted-average method employed by the Commerce Department. However, such a weighting scheme, based on a somewhat arbitrary method of "scoring" component performance, is not a major improvement over a method using only a simple average. A second problem with the leading indicator series is that the lead times are not very consistent over the study period. For example, the series leads the downturn in the economy beginning in 1974:5 by 14 months, yet it leads the recovery which began in 1975:10 by only 6 months. This is a serious problem that does not have an easy solution. In fact, the Commerce Department does not indicate the period by which the US series leads the national economy. However, the series described here does present a method of quantifying predicted changes in the state economy based on the performance of several key components of the Illinois economy.

JAMES R. FREW and G. DONALD JUD

Real Estate Brokerage Franchises: What Are Their Value?

In recent years, many real estate brokerage firms have chosen to affiliate with national or regional franchise organizations. The Department of Commerce estimates that there were some 15,413 franchisee-owned real estate brokerage firms in the United States in 1981. Franchise affiliates made up about 30 percent of all real estate brokerage establishments, and they had gross commissions totaling more than $3.2 billion in 1981. Commission income received by franchise firms grew 15.3 percent during 1981–83, while the number of franchise brokerage establishments increased 13.2 percent.

In the brokerage industry as elsewhere, franchising involves the sharing of intangible capital such as trademarks and goodwill between the franchisor and his franchisee. This kind of sharing often evolves because of a divergence between the scale of operation most efficient for promoting and advertising a brand or trademark and the scale of operation most efficient in the actual production of the product or service.

In the real estate industry, national trademarks or brand names are useful to consumers because it is difficult for buyers and sellers who are unfamiliar with a local housing market to obtain information on the quality of services available from local brokers. Instead of trying to gather information on their own, many buyers and sellers rely on a national trademark as a guarantee of minimum quality of service.

A survey conducted by the National Association of Realtors in 1980 revealed that 78 percent of respondents felt that "reputation of agent or firm" was very important in selecting a real estate agent. In contrast, only 28 percent listed the "commission or fee" charged by the broker as being very important.

Recognition of the importance of "reputation" to consumer choice in the brokerage industry suggests why brokerage trademarks manufactured through national advertising may yield significant economic

benefits. The National Association of Realtors has for many years sought to establish "Realtor" as a brokerage trademark. More recently, as federal antitrust decisions have curtailed the ability of realtors to continue their traditionally exclusionary practices, some individual brokers have formed associations to jointly promote themselves on a metropolitan or regional basis.

The value of a franchise affiliation or trademark to an individual real estate broker depends on the quality it "guarantees" to buyers and sellers. The promise of quality service to consumers is promoted by the franchisor through advertising and must be maintained through proper monitoring of the operations of franchise affiliates. For a franchise affiliation to have value over time, the franchisor must continue to advertise and to police the operations of the franchisees.

When a real estate broker buys into a franchise, he purchases the promise of the franchisor of the future value of franchise affiliation. Because future value to the broker depends on future actions by the franchisor, the broker (or any franchisee) usually will have a healthy skepticism about the worth of affiliation. The franchisor normally will not be able to get the broker to agree to pay a single, lump sum up front. Instead, payment for affiliation usually consists of some up-front charge plus a royalty fee collected as a percentage of sales. In this way, payments to the franchisor are linked to the future success of the franchisee, which in turn depends in part on the actions of the franchisor. In essence, the broker and the franchisor become partners in a joint enterprise, and each shares in the future profits of that enterprise. The franchisor usually will insist that the royalty fee be calculated on the basis of sales (or total revenue) rather than profits. This arrangement gives the broker (franchisee) the correct incentive to be efficient in the operation of those aspects of the enterprise that are under the broker's direct control.

We examined the impact of franchise affiliation on the operations of real estate brokerage firms in a recent article in the *AREUEA Journal*. ("The Value of a Real Estate Franchise," Vol. 14 (Summer 1986), pp. 374–83.) The following sections provide a summary of that article.

Franchise Affiliation is More Prevalent in Areas of Rapid Growth

A real estate franchise provides assurance of minimum quality to persons who must operate in a unfamiliar market setting. The greater the number of such persons in a local market, the more firms in that market are likely to choose to be franchise affiliated. An analogous situation is eating establishments along an interstate highway. Because most travelers on the highway are unfamiliar with local restaurants, it is usually advantageous for a restaurateur to affiliate with a franchise.

A similar situation exists in the real estate brokerage industry. In rapidly growing areas of the country, a large number of home buyers are recent inmigrants from outside the local area who are generally unfamiliar with the local housing market and have limited time to devote to searching because of the pressures of employment transfer. It is natural for such buyers to be drawn to a national franchise or trademark, and thus we can expect franchise affiliation among brokers in these areas to be more prevalent.

We found this to be the case when we looked at the fraction of real estate brokerage firms that were franchise affiliated in each of the 50 states. We found a significant positive correlation between the fraction of firms franchise affiliated and the rate of state population growth. This correlation suggests to us that franchise affiliation is more profitable for brokerage firms located in areas of rapid growth, where there is a substantial influx of buyers from outside the area.

Franchise Members Sell Higher-Priced Listings

If franchise affiliation provides prospective buyers with quality assurance, member brokers may attract those who wish to buy higher-priced listings. Of course, all agencies compete to assist these buyers, and since brokerage fees are typically a "percentage" of the sales price, selling more valuable property yields larger sales commissions. But such sales are particularly desirable to franchised agencies because association with them gives tangible support to the "quality image" that franchise membership is designed to enhance. Thus, affiliates should be eager to capitalize on any advantage expensive homebuyers perceive exists in enlisting their assistance, and greater quality assurance may give them the competitive edge they need over independent agencies.

To test this hypothesis, the average asking price of homes sold by franchise affiliates in Greensboro, North Carolina in 1979 was compared to that of independents. The average of 487 franchise sales was $44,152, while that of 446 independent sales was $41,727. A t-test revealed that the franchise group's average was significantly higher at the 95 percent (one-tailed test) confidence level. To be sure that this indicated a higher true market value rather than simply higher asking prices, actual sales prices of the properties sold by the two groups were also compared. Again, the franchise average ($43,142) was significantly higher than the independent's ($40,906) at the 95 percent confidence level.

These differences indicate to us that franchised firms attract a somewhat different mix of customers than nonaffiliated firms. Part of this difference stems from the fact that franchised firms attract more buyers who are moving in from out of town. In Greensboro, out of town homebuyers moving in from the North and East tend to have higher incomes and to spend more on housing than do resident buyers.

Franchise Affiliation Increases Brokerage Sales

To quantify the value of franchise membership, we conducted a survey of brokerage firms in three North Carolina cities (Charlotte, Greensboro, and Raleigh) during 1982. Brokers were questioned about the structure and operation of their businesses and their attitudes toward real estate franchising.

All agencies in the three cities (that were listed in the yellow pages) were surveyed, and responses were obtained from over 50 percent of them, a very high percentage for a survey requesting information of such strategic importance to competitors. This high a response rate minimized one important source of estimation error: sample bias. To further reduce such bias, firms who indicated that they did not consider residential real estate sales their main specialty were removed from the sample. Eighty-four responses remained; 21 percent of these (18) reported that they were affiliated with a franchise.

Comparison of the experience levels between the two groups revealed little difference, but franchised firms did have somewhat larger staffs who possessed different amounts of experience. Large differences were reported in sales. Franchise affiliates reported an average of $4.5 million in sales.

To determine what portion of the difference in average sales to attribute to the franchise membership, rather than differences in other characteristics, a regression equation was estimated. The regression equation statistically held constant other factors that also affect sales, such as, size of the firm's sales force, broker and staff experience, and so on. The analysis revealed that brokerage firms affiliated with national franchises had substantially higher sales than nonaffiliated firms. For the average firm in the sample, franchise affiliation appeared to add about $930,000 to firm sales.

Affiliated Firms Share Gains with National Franchisers

In the brokerage firm survey, franchise firms were questioned regarding the cost of franchise affiliation. The 15 firms affiliated with national franchises reported the following average costs associated with their franchises:

1. Initial Fee	$4,000
2. Royalty on Gross Commissions Earned	3%
3. Advertising Fee, Collected on Gross Commission	2%

To calculate an average benefit-cost ratio for franchise membership, information on the average commission rate charged on home sales and the normal commission split was required. Talks with local realtors indicated that the average rate charged on residential sales was about 6 percent. Of this, there was usually a 50–50 split between the listing and selling agents. If the salesperson who sold the property was employed by the listing agency, he (she) usually received 25 percent of the total commission, or about 1.5 percent of the sales price.

If the franchise firm is not the listing agency, the firm would normally receive half of the 6 percent commission, or 3 percent of the sales price. Of this, the franchise broker would pay his salesman one-half of what the firm received, or 1.5 percent of the sales price as a sales commission.

Our previous analysis indicated that the average broker received an additional $930,000 in sales because of franchise affiliation. Assuming that he is not (also) the listing agent for these sales, he would retain 1.5 percent of the additional sales, or about $13,950 after he paid his salesman.

The average firm affiliated with a national franchise had $5.3 million in sales. The 3 percent royalty fee plus the 2 percent advertising fee would be collected from this $5.3 million in sales. Assuming that the franchise firm was not the listing agency on any of these sales, the firm would receive gross commissions totaling 3 percent of sales, or some $159,000. Of this the firm would be required to pay $7,950 in royalty and advertising fees to the national franchise organization.

The cost of the franchise also includes the interest on the initial franchise fee. Assuming an interest rate of 10 percent, this would amount to $400. Adding this to the annual fees, the total annual cost of franchise affiliation for the average firm in the sample was estimated to be $8,350, so *the net value of membership was $5,600* (that is, $13,942 − $8,350 = $5,600).

These calculations suggest that the average franchise broker receives a portion of the profits created by the national franchise trademark. Because they receive a net benefit from franchise affiliation, it is to be expected that franchise affiliates would support the franchise arrangement. As expected, the survey also found that opinions of franchising expressed by brokers affiliated with a national franchise were favorable. Of national affiliates, 60 percent agreed with the statement that "franchise affiliation offers greater profit potential." Ninety-three percent agreed that "franchising enhances the competitive ability of the firm." Only 13 percent reported that they planned not to continue their affiliation with their national franchise.

The opinions of affiliates were found to accord with other evidence. *On balance, franchise affiliation in the real estate brokerage industry seems to be beneficial for the average affiliate because the franchisor appears unable to extract the full value of the additional sales that accrue to the affiliated broker because of the franchise trademark.*

James R. Frew is on the faculty of the Department of Economics, Willamette University, and G. Donald Jud teaches in the Department of Finance, University of North Carolina at Greensboro.

ERRATUM: In the July 1986 *Illinois Business Review* we mistakenly listed Arthur Getis's article, "Economic Well-Being among Chicago's Suburbs," as research funded by the Office of Real Estate Research. This was not the case.

CAROLYN WOI

Computer Crime: The Crime of the Future is Here

On 3 June 1986 the House of Representatives passed the Computer Fraud and Abuse Act of 1986. This bill makes the use of computers for certain cases of theft or fraud a federal felony. It is intended to strengthen states' efforts in combating computer crime and is expected to be ratified in the Senate. It should be noted that this bill comes after a computer crime bill passed last year that makes it a felony to use a computer in a way that might harm the national interest. The new bill is more general.

Computer technology affects nearly everyone. There are currently more than 200,000 computer centers in the United States, and we are becoming increasingly dependent on the computer. Total user spending on data processing in the United States is expected to increase from 2.1 percent of GNP in 1970 to 13 percent in 1990.

With the advent of computer technology, there has been an emergence of computer crime. A South African jewelry company reported computer-based thefts worth $3.5 million in August of 1983. A group of youths in Milwaukee penetrated the computerized radiation-therapy records of cancer patients in a Manhattan hospital last summer. When hospital authorities ordered the youths to stop tampering with their computer system, one youth responded that he and his friends "would be stopped in a couple of years by technological improvements in the computer systems." Although computer crime is now common, much remains to be known about the subject. Experts disagree on many aspects of the issue, ranging from how to define computer crime to its prevalence.

Defining Computer Crime

Some experts do not think that computer crime deserves attention as a separate category.

According to this view, computers are merely an up-dated means to commit old crimes. If someone steals a personal computer from a university, this crime can be accurately classified as theft. Misuse of company funds through the use of a computer can be termed embezzlement. Hence, some people feel that the term crime by computer is more appropriate than computer crime.

Others suggest that there are a number characteristics of computer crime that distinguish it from other types of crime. For example, the losses due to a computer crime are generally larger than the losses associated with other crimes. The technology associated with the computer at present also makes it difficult to detect most computer crimes. In fact, most computer crimes are discovered by accident. Even when a computer crime is detected, it often goes unreported. Figures on computer crime are understated due to the problem of detection and a number of other factors. For example, victims of computer crime often fear a loss of public confidence. Also, since proof of the crime is difficult to assemble, there is a heightened risk of false-arrest charges. Some people also feel that the publicity about computer crimes will lead others to try similar things. Another aspect of computer crime that distinguishes it from other types of crime is the difficulty of prosecution. Lawmakers in one-half of the states have only recently enacted laws dealing specifically with computer crime.

Four major categories of computer crime have been identified: introduction of fraudulent records or data into a computer system, unauthorized use of computer-related facilities, alteration or destruction of computerized information or files, and theft by electronic or other means of money, "financial instruments," such as checks and credit cards, and "valuable data" such as computer programs in machine- or human-readable form.

A number of specialists have attempted to examine the extent of computer crime in our society, but since the experts do not agree on exactly what computer crime is, their studies must be interpreted in light of their varying definitions.

A US General Accounting Office (GAO) study defines computer-related crimes as "acts of intentionally caused losses to the Government or personal gains to individuals related to the design, use or operation of the system in which they are committed." The GAO study gathered data from 10 federal investigative agencies. Sixty-nine cases of computer crime were uncovered. The average and median loss caused were found to be $44,110 and $6,749 respectively.

Donn Parker, who conducted a study at Stanford Research Institute (SRI), defines computer abuse as "any incident associated with computer technology in which a victim suffered or could have suffered loss and a perpetrator by intention made or could have made gain." The data for this study were from a variety of sources, and according to John Taber, only 77 of the 375 cases used in the study were verified. In this study the average loss due to computer crime was $450,000, 10 times the GAO estimate. The discrepancy could be a result of the different definitions of computer crime used in each study and the type of cases analyzed. The GAO study focused only on computer crime in the federal government, while the SRI study included the private sector.

A study by Brandt Allen used a more strict definition of computer crime than Donn Parker's. In his study, he divided the SRI data into four groups and estimated the average loss in each category. The resulting average losses per category were as follows:

1. Cases committed in corporations $621,000
2. Cases committed in banks and savings and loans $193,000
3. Cases committed in state and local government $329,000
4. Cases committed in federal government $45,000

When the SRI data were divided, losses as a result of computer crime in the federal government were consistent with the GAO estimates. It is important to realize, however, that the results of these studies are based on data of reported computer crimes. Actual losses may have been quite different from what these figures suggest.

Protection against Computer Crime

Increased computer security is one means of deterring computer crime. In the past, computer systems were designed for easy use by people with limited computer experience. Computer systems that are easily accessible by first-time users are said to be user-friendly. There is a trade-off between increased computer security and the degree to which a computer is user-friendly. In general, if a system is user-friendly it is also vulnerable to unauthorized use. For example, computer networks such as Telenet and Tymshare, rent time on a host computer to numbers of users throughout the nation, and easy access is a key feature of the systems. Floyd Trogdan, head of network services at Telenet states, "We have a public network; it needs to be user-friendly. Would we consider making it harder to penetrate? We might. But you have to recognize that we provide a service and that the general customer wants easy access."

The move to increased computer security has lagged behind the times according to many experts. According to Geoffrey Goodfellow, a computer security researcher at SRI, "I don't think that most people are taking reasonable and prudent measures to protect their computer systems." Martin Hellman, a computer scientist at Stanford University, reinforced this belief: "It's terribly unethical for computer centers and networks to have the low level of security that they do. It's like leaving the keys in the ignition of an unlocked car."

Most cases involving unauthorized access of the University of Illinois computer (that is, theft of computer funds) are due to user carelessness, although the university system has a number of checks and safeguards to protect computer funds. For example, audit trails are built into the system. In addition, whenever anyone uses the computer system a message appears at the beginning of the computer session giving the last time he or she used the computer. If the time given does not seem to be accurate, this could signal unauthorized use of the system. It is ultimately the responsibility of the user to attempt to prevent unauthorized access. The message informing the user

of the last recorded computer session is useless if ignored, or if signon information is left in public. (Signon information consists of an individual's social security number, their password, and billing information. This information must be entered on the computer before using the system.)

Increased computer security is a first step toward deterrence, but it cannot reduce computer crime to zero. As Donn Parker puts it, "With even the most advanced computer systems, there is no known practical way of protecting user organizations if penetrators have sufficient skill, knowledge, access, and resources." Although increased computer security cannot totally eliminate computer crime, experts have agreed on a number of steps that can be taken to reduce the likelihood of its occurrence. Steps identified by the American Society for Industrial Security are as follows:

1. Separation of knowledge through the division of responsibilities, job rotation, physical isolation, controlled access, and logging of stoppages and interruptions.
2. Written programming instructions with threat monitoring and audit trails built in.
3. Careful accounting of all input documents.
4. Periodic changes in access codes and passwords.
5. Scramblers and cryptographic applications in data transmission.

Another means by which computer owners can protect themselves from losses is through the purchase of insurance against computer crime. Insurance provides a very significant risk management option beyond practicing loss prevention procedures. Approximately 20 million electronic-crime policies had been sold as of October 1983. Coverage varies among insurers. With the increase in cases reported in the news recently, demand for computer crime coverage has increased. The dollar amount of policies is expected to reach 100 million in the next three years.

The Need for Computer Crime Legislation

In addition to increased computer security, some experts feel that special computer crime legislation is needed to deter would-be computer criminals. Reasons cited for the need for special computer crime laws include:

1. The current lack of security in computer systems.
2. The difficulty of prosecution under laws that do not deal specifically with computer crime.
3. The need to alert the general public, and computer users in particular, to the risks of computer crime and awaken them from their false sense of security.

One of the difficulties in prosecution under laws not specifically dealing with computers lies in the definition of property. For example, in *Lund* vs. *Commonwealth of Virginia*, the Virginia Supreme Court decided that the taking of computer time and services in the form of printouts did not constitute larceny. The subject matter of larceny must be goods and chattels. The court found that computer time and services were not goods or chattels even though their taking represented a loss to the rightful owners.

Currently, one half of the states have computer crime laws. Florida, in 1978, was the first state to adopt this type of legislation. In 1979, Illinois joined a number of other states in enacting a law against computer crime. According to the Illinois law, a person commits unlawful use of a computer when he or she:

1. Knowingly obtains the use of a computer system, or any part thereof, without the consent of the owner; or
2. Knowingly alters or destroys computer programs or data without the consent of the owner; or
3. Knowingly obtains use of, alters or destroys a computer system, or any part thereof, as part of a deception for the purpose of obtaining money, property, or services from the owner of a computer system or any third party.

The sentences under this law range from a petty offense to a Class 4 felony, depending on the violation and the value of the loss incurred. Penalties range from less than $500 to a maximum of $10,000 and three years in jail. The Illinois law, like many other state laws, does not require that the victim take reasonable care in protecting their system from harm. A contributory negligence standard has not been adopted. In addition, individuals are not required to report a computer crime that they have witnessed. Thus, reliable data on the extent of computer crime will still be lacking. As of the beginning of 1984, no cases were tried under the Illinois computer crime law in an appellate court. This is not surprising, however, given that the law has only been in effect for five years.

State laws do not apply to computer crime offenses involving interstate and foreign commerce. In these cases, prosecution under federal law is necessary. A federal computer crime bill was first introduced in 1977, and since this time it has undergone a number of revisions.

Conclusion

Experts disagree on whether computer crime is a serious problem. According to Donn Parker, "the only safe computer is one that's not used." In contrast, John Taber feels that "computer crime is insignificant... computers should minimize the incidence of crimes such as fraud and embezzlement". A recent survey by the American Bar Association, however, lent support to the belief that computer crime deserves increased attention. The survey indicated that almost one-half of the respondents had been victims of electronic lawlessness in the preceding year. Twenty-five percent claimed that their losses ranged from $2 to $10 million yearly. In addition, several unique characteristics of computer crime distinguish it from conventional crime. Advanced technology has brought the crime of the future to the present.

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Illinois Business Indexes

This issue of the *Illinois Business Review* highlights consumer price indexes. Six graphs are presented for the five North Central US indexes in addition to the Chicago, Illinois CPI. These six graphs, rather than showing index levels, show bimonthly percentage changes except for the Chicago CPI, which shows monthly percentage changes.

The five North Central indexes show declines for February and April. The Chicago index also shows a decline for roughly the same period. Even more important, these are the first significant monthly declines in the indexes for several years. For example, the Chicago and North Central indexes last fell at the end of 1984. However, these were very slight declines. The North Central index (population greater than 1,250,000) last fell in December 1984 but only by .12 percent. In its ten year existence the North Central index (population 385,000 to 1,250,000) had never declined prior to August 1985. The North Central index (population 75,000 to 385,000) had only declined twice prior to August 1985. The index fell by .48 percent in December 1984 and by .26 percent in February 1983. The North Central index (population less than 75,000) had not fallen significantly since December of 1982 when it fell by 1.4 percent.

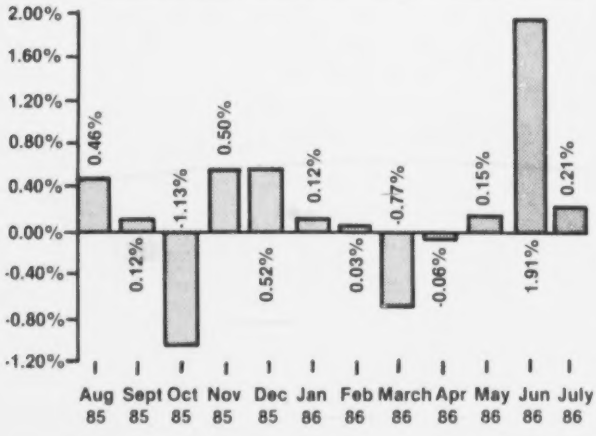
Illinois Business Indexes

	Percent Change July 1985-July 1986	*July 1986*	*June 1986*	*May 1986*	*April 1986*	*July 1985*	*June 1985*
Coincident indicator (1969 = 100)	5.44%	128.92	128.20	126.28	124.70	122.39	122.80
Employment-manufacturing (in thousands)[a]	0.89%	960.3	961.3	959.1	964.4	951.8	959.4
Average weekly hours-manufacturing[c]	1.49%	40.8	40.8	40.7	40.7	40.2	40.7
Weekly earnings-manufacturing[c]	3.84%	$433.70	$432.07	$431.42	$431.01	$417.68	$423.28
Help wanted advertising-Chicago (1969 = 100)[a]	1.98%	103	101	86	94	101	99
Help wanted advertising-St. Louis (1969 = 100)[a]	-2.99%	65	70	65	65	67	73
Retail Sales (in millions)[b]	-0.95%	$5,299	$5,458	$5,720	$5,288	$5,350	$5,347
Coal production (in thousands of tons)	1.99%	4,355	5,325	5,456	5,866	4,270	4,750
Petroleum products (in thousands of barrels)[e]	-6.93%	2,350	2,175	2,267	2,376	2,525	2,445
Vendor performance[g]	22.73%	54.0%	50.0%	55.0%	50.0%	44.0%	44.0%
Building permits (in thousands)							
Residential housing units	12.43%	4,992	5,141	6,093	6,362	4,440	4,012
Value of Residential housing	39.26%	$345,144	$320,542	$374,180	$374,451	$247,850	$223,064
Value of nonresidential construction							
Industrial buildings	6.42%	$36,706	$27,825	$49,990	$21,912	$34,493	$28,321
Office, banks, and professional buildings	-72.28%	$33,019	$38,042	$29,418	$32,654	$119,121	$22,439
Stores and other mercantile buildings	32.87%	$41,720	$31,538	$44,558	$36,378	$31,400	$17,680
Other	10.34%	$5,600	$7,953	$2,782	$3,903	$5,075	$6,273
Consumer price index (December 1977 = 100)							
North Central US[c]	1.09%	—	176.1	—	173.9	—	174.2
North Central/population more than 1,250,000[c]	1.52%	—	180.3	—	177.8	—	177.6
North Central/population 385,000 to 1,250,000[c]	0.87%	—	174.1	—	172.1	—	172.6
North Central/population 75,000 to 385,000[c]	0.65%	—	170.7	—	168.5	—	169.6
North Central/population less than 75,000[c]	0.53%	—	171.3	—	170.0	—	170.4
Chicago (1967 = 100)	2.07%	331.1	330.4	324.2	323.7	324.4	324.1
St. Louis (1967 = 100)	1.78%	325.6	—	318.6	—	319.9	—
		1986:I	1985:IV	1985:III	1985:II	1985:I	1984:IV
Personal income (in millions)[d,e,f]	4.81%	$169,220	$169,938	$165,608	$164,481	$163,275	$162,133
Per capita personal income[d,e,f]	3.79%	$14,477	$14,550	$14,189	$14,103	$14,009	$14,018

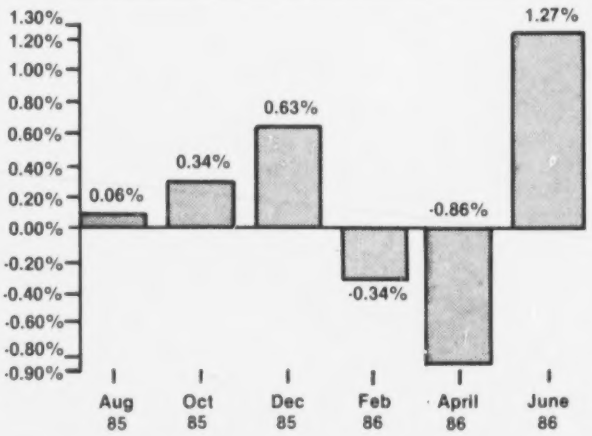
[a]The Conference Board, *Help Wanted Advertising*, July 1986. [b]Latest month projected by BEBR. [c]Percent change between June 1985 and June 1986. [d]Percent change between 1985:I and 1986:I. [e]Recent month is preliminary figure. [f]Seasonally adjusted at annual rates. [g]Percentage of companies receiving slower deliveries.

Changes in Various Consumer Price Indexes (monthly for Chicago, for all others, bimonthly)

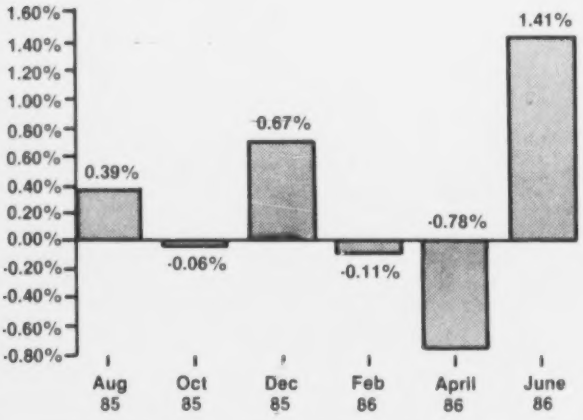
Chicago (1967 = 100)



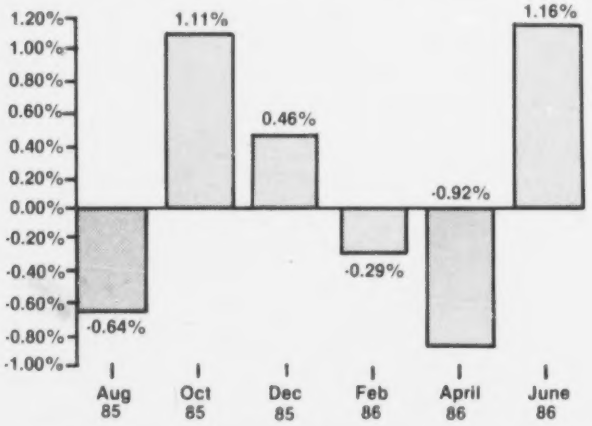
North Central US (December 1977 = 100)



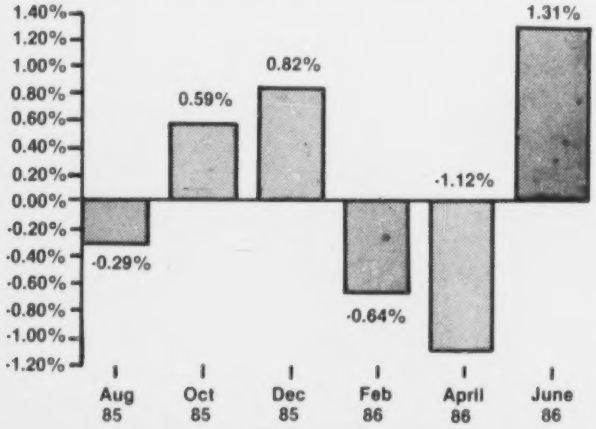
North Central US—Population over 1,250,000 (December 1977 = 100)



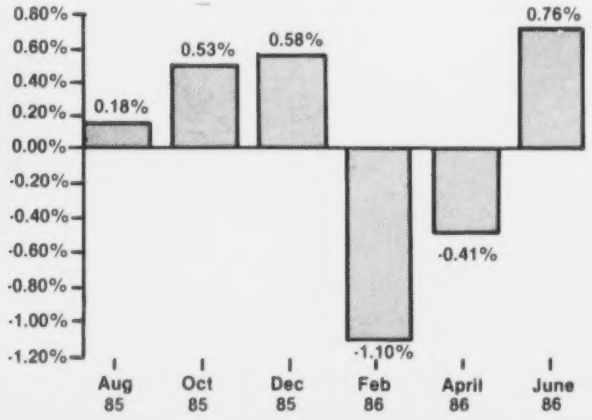
North Central US—Population 385,000 to 1,250,000 (December 1977 = 100)



North Central US—Population 75,000 to 385,000 (December 1977 = 100)



North Central US—Population less than 75,000 (December 1977 = 100)



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Illinois Economic Outlook

Illinois Personal Income (Millions of Dollars, Seasonally Adjusted Rates)

				History				Forecast			
	(1)	(2)	(3)	85:II	85:III	85:IV	86:I	86:II	86:III	86:IV	87:I
Total	173,206	169,220	-2.30	165,481	165,219	169,625	169,220	168,743	170,393	173,106	175,344
Total, Private Nonagricultural	103,896	103,712	-0.18	100,020	101,053	102,608	103,712	103,944	105,269	107,083	108,475
Mining	1,116	1,043	-6.54	1,172	1,129	1,103	1,043	1,070	1,030	993	978
Construction	6,116	5,711	-6.62	5,917	5,967	5,917	5,711	5,965	6,073	6,145	6,194
Manufacturing	29,386	28,426	-3.27	28,579	28,149	29,087	28,426	28,514	28,822	29,092	29,254
Nondurable Goods	10,967	10,728	-2.18	10,637	10,633	10,876	10,728	10,725	10,904	11,057	11,168
Durable Goods	18,419	17,698	-3.91	17,942	17,516	18,214	17,698	17,789	17,918	18,035	18,086
Transportation and Utilities	10,011	9,837	-1.74	9,493	9,868	9,916	9,837	9,772	9,784	9,927	10,037
Wholesale Trade	10,278	10,281	0.03	9,903	9,993	10,116	10,281	10,394	10,560	10,734	10,914
Retail Trade	10,771	10,589	-1.69	10,341	10,612	10,563	10,589	10,766	10,954	11,126	11,294
Finance	9,990	10,555	5.66	9,403	9,516	9,792	10,555	10,731	10,880	11,177	11,375
Services	26,289	26,928	2.43	24,839	25,503	25,785	26,928	26,732	27,165	27,889	28,429

(1)–Last Forecast for 1986:I. (2)–Historical Value for 1986:I. (3)–Percentage Error in Forecast.

Illinois personal income showed a slight dip of .24 percent in the first quarter of 1986, according to figures released by the Bureau of Economic Analysis. However, total nonagricultural personal income for the state had a 1.1 percent upturn in 1986:I, with most of the credit going to strong advances in the finance (7.8 percent) and service (3.7 percent) sectors. On the other hand, mining personal income fell by 3.5 percent, construction by 3.5 percent, and manufacturing fell by 2.3 percent. The Illinois Econometric Model performed well in terms of total personal income for the first quarter of 1986, with a forecasting error of 2.30 percent (an overestimate). However, there were larger errors in the mining (6.54 percent), construction (6.62 percent), and finance (5.66 percent) sectors. The model predicts better news for the last half of this year and the first quarter of 1987. As the graph shows, the growth rates of personal income will be between 1 percent and 1.6 percent per quarter over these three quarters.

Illinois Personal Income Growth Rates (in percentages)